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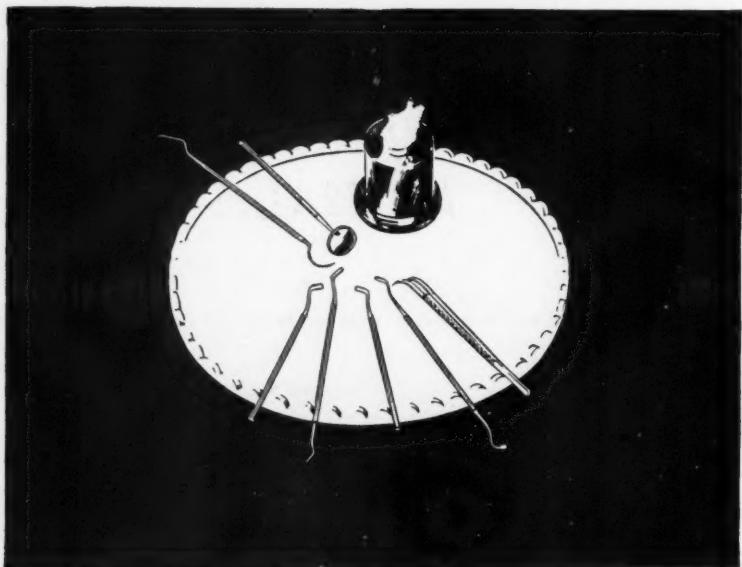
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Vol. 22

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No. 8

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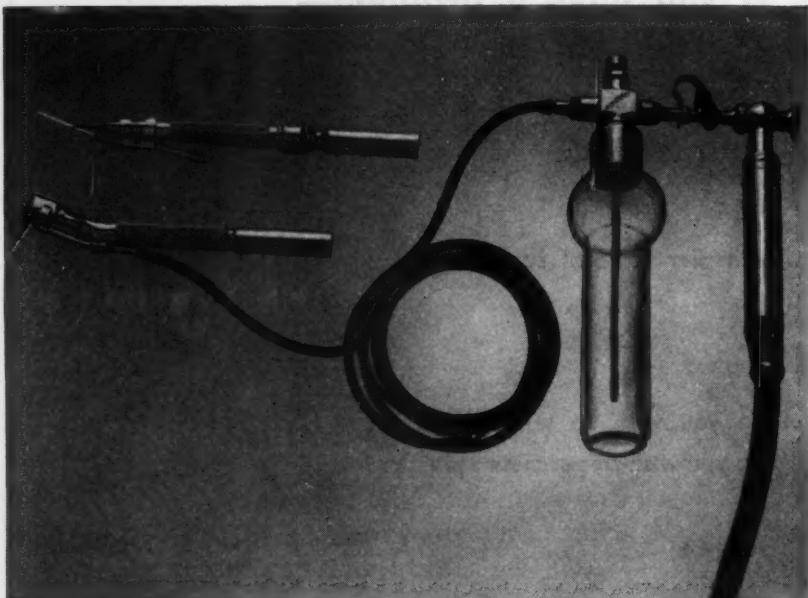
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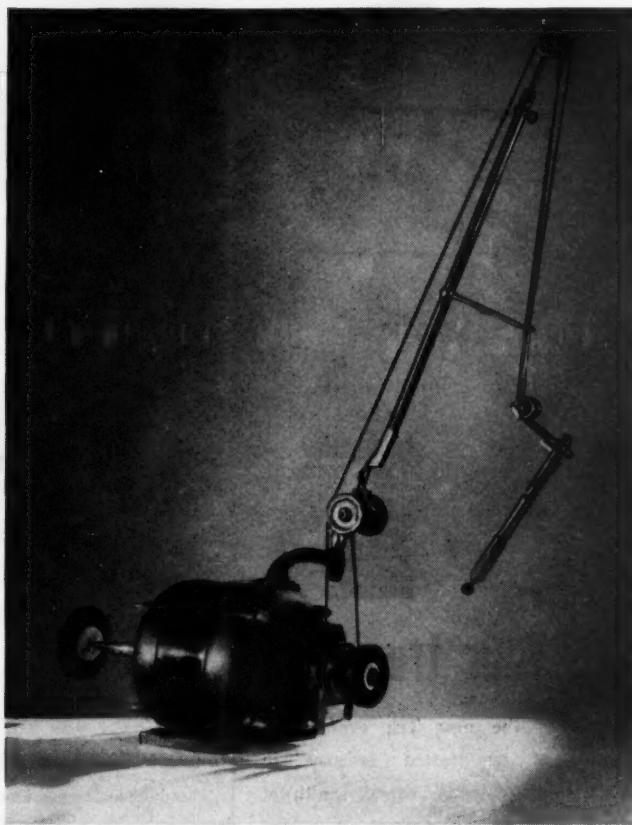
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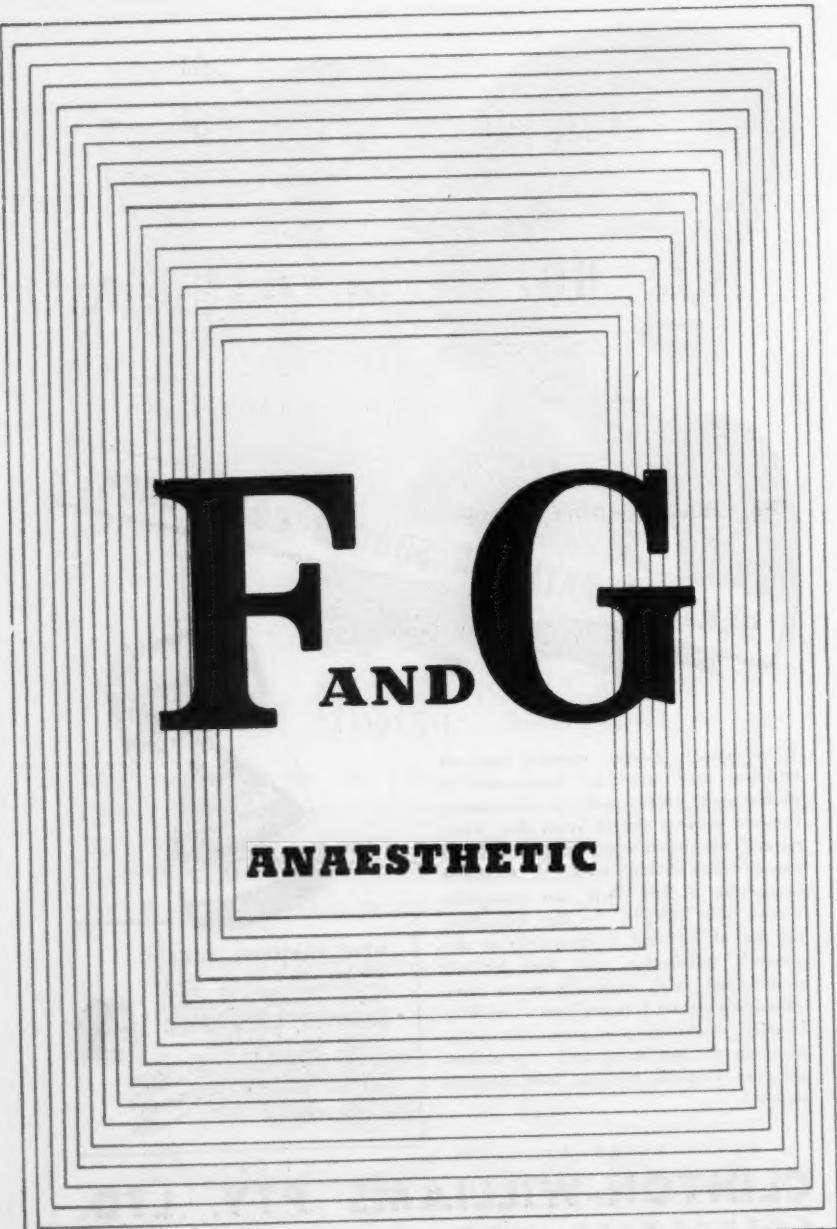
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**THE PLACE OF THE GENERAL PRACTITIONER IN PRESENT-DAY
ORTHODONTIC THERAPY.**

KENNETH T. ADAMSON, D.D.Sc. (MELB.)†

I have been asked to speak about the problem of "Orthodontics for the General Practitioner," and I am sure that you must all realise that to do this subject justice one would need not merely one night but many nights—so I ask your pardon if I omit anything which some of you may think should have been included.

INTRODUCTION.

In an article entitled "A Challenge to the Profession"¹ which recently appeared in the *Australian Journal of Dentistry*, we find a passage quoted from a text-book on children's dentistry by Brauer, Higley, Massler and Schour.² It says—"Many difficult problems confronting the general practitioner and orthodontist could be eliminated if preventive orthodontics were more thoroughly understood and practised by all dentists who do work for children. Under such conditions true denture guidance might supplant much of the salvaging now necessary on the part of the orthodontist and simplify the placing of artificial restoration by the dentist. Preventive orthodontics should include the prevention and correction of incipient deformity by elimination of the etiologic factors where possible, and by the application of simple interceptive or early remedial treatment. If this be true, then the dentist wishing to include such service in his practice must be able to:

1. Recognise incipient deformity.
2. Understand the etiology of deformity.
3. Institute preventive measures, and
4. Perform simple corrective measures.

Let us face facts from the very beginning—is it not true that half the problems which confront the general practitioner in Orthodontics have their

†Senior Lecturer in Charge of Orthodontia, Dental School, University of Melbourne,
Honorary Consultant Orthodontist, Dental Hospital of Melbourne.

*From a lecture delivered in Sydney, March 27, 1950.

1. Adamson, Kenneth T.—A challenge to the profession, *Aust.J.Dent.*, 54:10, 1950.
2. Brauer, J. C., et al.—*Dentistry for Children*. Philadelphia, Blakiston & Co., 1947.

origin in his lack of knowledge of the subject? Orthodontics has always been regarded as something quite outside his sphere. How many times do you hear it said, "Oh I never do any of that; the less I see of it the better, I send it all to so and so." This attitude seems to have arisen from the mistaken idea that Orthodontics begins and ends with complicated appliances—nothing is further from the truth. "A sound orthodontic background confers a broader and fuller outlook on dentistry as a whole. It can completely revolutionise the approach to children's dentistry, and materially assist in solving many problems in the field of prosthetics, periodontics, conservative dentistry, and even oral surgery."³

During the last eighteen months the attention of the dental profession has been focussed on the Federal National Health Plan which is to include a Dental Health Service. The present intention would seem to be that this will begin with the pre-school-age child, and gradually be extended to adolescents. We feel with the English orthodontist, Russell Logan,⁴ that—"In any scheme designed to promote and maintain the health of the community, orthodontics, which is directed towards establishing the efficient mechanical structure of the teeth and jaws, must be one of the fundamentals." This envisages the necessity for many more people becoming interested in the subject than there appear to be at the present time. Interest does not necessarily imply specialisation, but an intelligent appreciation of possibilities. Orthodontics has made good progress during the last fifteen to twenty years, perhaps more than any other specialised branch of dentistry. This period has witnessed a complete revolution of thought, so that what was once regarded as merely a mechanical problem involving the movement of teeth, has now become a biological one, with all the intriguing factors of growth and development of living tissues.

The responsibility for providing orthodontic treatment rests with the general practitioner and the specialist. A close and understanding co-operation between these two can, and should, provide a type of service to suit any purse.

If you have a large children's practice or are interested in children's dentistry, bring your knowledge in Orthodontics up-to-date and make yourself just as efficient a diagnostician of malocclusion as the orthodontist. The amount of treatment you carry out depends on your interest in the subject, for if you wish to extend your services to include the treatment of all cases you will have to be prepared to undertake some post-graduate study to learn the use of fixed appliances. But there is much the general dentist can do without this if he can:

1. Recognise incipient deformity.
2. Understand the etiology of deformity,
3. Institute preventive measures, and
4. Perform simple corrective measures;

then, many of his Orthodontic problems will automatically disappear, for he will view each one with an understanding eye.

Is such a standard an impossible one for every dentist to have or to acquire? We believe it is not, and it is intended to indicate briefly how we think he can best begin to train himself to think orthodontically.

3. Adamson, Kenneth T.—*loc. cit.*
4. Logan, W. Russell—The place of orthodontics in a health service. Proc. 11th Aust.Dent.Cong., 1948. P. 270.

THE EXAMINATION OF THE MOUTH FOR ORTHODONTIC PURPOSES.

This must not be in the nature of a hasty glance but should be done in an orderly manner, following the same routine each time so that it becomes a habit.

Have at your side a full X-ray survey, and begin the examination of the mouth with the upper and lower jaws individually and the mouth open.

1. Make a chart of the dental condition of the mouth which should include necessary fillings and extractions, the standard of mouth hygiene and general health of the oral tissues.

2. Note the teeth present, their position, and the presence or absence of missing or unerupted teeth which should be checked from the X rays. Extra-oral pictures of 3rd molar areas are essential in older patients, *i.e.*, in patients where all deciduous teeth have been lost. Remember, 3rd molars begin to form as early as the ninth year.

3. Examine the form of the dental arches—are they narrow or broad? Are the teeth crowded or have they plenty of room?

4. Note the size of the teeth and compare them with the development of the jaws. At the same time, correlate the general physical development of the child with his or her age. A very small-boned child with big teeth has little hope of ever accommodating thirty-two teeth.

5. Look carefully at the plane of occlusion—that imaginary line (first named by Angle) where the teeth meet when in occlusion. Is it normal? Is there an exaggerated curve of Spee? Are any individual teeth well above or below it?

Now, have the patient close the jaws together and then continue your examination.

1. Determine the relationship of the mandible to skull anatomy—is it normal or is it posteriorly placed or is it in forward relationship? This is the basis of the Angle classification, in other words, which class does the case fall into: Class I, Class II, or Class III?

2. Consider the depth of the overbite. Is it normal? The usual overlap for most white races is such that the upper incisors overlap the lowers to $\frac{1}{3}$ of their height. Is it open—when the incisors do not meet—or is it closed? If so, to what degree?

Learn to correlate your findings here with those concerning the plane of occlusion (explained later in the text).

3. Check the upper and lower centre lines of the denture with that of the face (the centre of the philtrum of the lip can be regarded as the centre of the face), and with each other. This helps to draw attention to any asymmetrical development of the dentition.

If this examination becomes a routine procedure with every child, the information thus obtained will help to solve many difficulties.

Now let us make a closer examination of the four requirements set out by Brauer⁵. The first was to:

RECOGNISE INCIPIENT DEFORMITY.

This necessitates some knowledge of (a) normal occlusion, (b) the classification of malocclusions.

5. Brauer, J. C., et al.—*loc. cit.*

(a) *Normal Occlusion.* It is quite obvious that if anyone is to recognise the abnormal, he must first of all know the normal. Perhaps there is no word which is more misunderstood in the nomenclature of orthodontics in general and occlusion in particular. It seems to indicate one perfect relationship for the crowns of the teeth, but such is not the case. There is a great range of variability existing in the form and relationship of the teeth of human beings. Nevertheless we must assume that all know the normal general arrangements of the teeth in the deciduous, mixed and permanent dentitions; however, it is easy to mistake some stages of normal growth and development for a malocclusion. Broadbent⁶ pointed out, mistakes are most commonly made in relation to:—

1. The relationship of the 6-year-old molars whilst the deciduous teeth are still *in situ*.
 2. The position of the upper laterals during the eruption process of the permanent canines.
 3. Spacing between the upper central incisors.
1. *The relationship of the 6-year-old molars whilst the deciduous teeth are still in situ.*

We know that finally the normal relationship of the upper 1st permanent molars to the lower is that the mesio-buccal cusp of the upper first molar lies



Fig. 1.

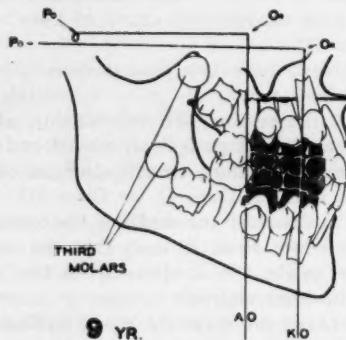


Fig. 2.

Fig. 1.—Normal occlusion of first permanent molar teeth in adult dentition.
Fig. 2.—Occlusion of first permanent molars in mixed dentition. Note that they are edge to edge.

between the mesio-buccal and disto-buccal of the lower, and the mesio-lingual cusp of the upper molar lies in the central of the lower. (Fig. 1.) However, so long as the deciduous teeth are *in situ*, the relationship of these molars is edge to edge. (Fig. 2.) This is frequently mistaken as an indication of a distal relationship of the lower molar to the upper and, in terms of the Angle classification of malocclusion, this is taken to indicate a distal position of the mandible: in other words, a Class II malocclusion.

6. Broadbent, B. Holly.—The face of the normal child. Angle Orthodont., 1937, p. 183.

2. The position of the upper laterals during the eruption process of the permanent canines.

Broadbent⁷ describes a stage in the development of the dentition which he terms the "ugly duckling" stage, in which it is quite normal for the upper laterals to erupt with their mesial angle lingually and to have their crowns tipped sideways so that their roots point mesially. (Fig. 3). It is the result of pressure on the roots from the erupting canines and must not be confused with the labial displacement of the lateral crown which occurs when this cuspid pressure becomes excessive. This occurs in cases where there is marked general under-development of the jaws which results in an abnormally forward position of the canines. (Fig. 4.) The former condition corrects itself when the permanent canines have erupted into the mouth—the latter usually requires treatment, but at the correct time, and this is *not* as soon as it becomes evident. One must wait until the permanent canines have erupted and moved away



Fig. 3.



Fig. 4.

Fig. 3.—The "ugly duckling" stage described by Broadbent.

Fig. 4.—Displaced laterals due to abnormal canine pressure, sometimes confused with the condition in Fig. 3.

from the lateral roots. Most parents can see only as far as the six anteriors, and they notice this displacement of the laterals and become very concerned about it. If you cannot differentiate between these two conditions, you cannot give them the correct prognosis.

3. Spacing between the upper central incisors.

In some mouths it is quite normal for a space to exist between the upper central incisors until the permanent canines erupt. (Fig. 5). As these teeth force themselves into the mouth the space closes, and at the same time the apparently abnormal position of the laterals corrects itself. The space between the central incisors is frequently interpreted as an abnormal fraenum. One wonders how many of these are needlessly removed. The recent trend of thought is to be more and more conservative in this regard and there are very

7. Broadbent, B. Holly.—*loc. cit.*

few fraenum so abnormal as to maintain the space between the upper central incisors.

(b) *The Classification of Malocclusions.*

The second essential for the recognition of an incipient deformity is a clear understanding of the Angle classification and the ability to apply it.

In 1899, Angle⁸ presented his classification to the profession, and although it has been freely criticised ever since and many other variations suggested, it is the most universally accepted classification today. The reason for its continued use in spite of certain recognised weaknesses is its fundamental simplicity. It postulates that there are three positions the mandible may occupy in relation to the skull and therefore to the maxillae, as they are attached



Fig. 5 (a).—Normally developing dentition.

Fig. 5 (b).—Space between permanent incisors, part of normal development.

Fig. 5 (c).—Space closed on eruption of canines.

to the base of the skull. It may be normal, or it may be distally or mesially placed. The position of the mandible can be judged by using the teeth as indication of jaw relationship, particularly the first permanent molars, upper and lower, and the canines. A study of the profile will help to confirm the position indicated by the tooth articulation.

It is only natural, however, that we must first of all be certain that the teeth themselves are in their correct positions in relation to their respective jaws, otherwise the information they give us may be misleading. To be certain of this fact is perhaps the greatest difficulty associated with the

8. Angle, Edward H.—Classification of malocclusion, *Dental Cosmos*, 41:240-268, 1899.

process, and it is a pity that time does not permit an explanation of this classification in detail, but we would stress the point that it is essential for any dentist with a large children's practice to master it. Why? Supposing a parent asks you, "Do you think his or her mouth will improve if nothing is done?" You cannot answer this question honestly unless you can classify the malocclusion, for, while some types of malocclusion with a normal relationship of the mandible to skull anatomy may more or less correct themselves in



Fig. 6 (a).—Class I. with the upper mesial. Note forward slope of upper canines indicating forward position of upper denture.

time, one which has the mandible distal or mesial to skull anatomy, *i.e.*, a Class II or Class III, never will; in fact, it will certainly become worse.

This points to the earliest possible correction of the malocclusion in this type of case, and yet how often do we hear it said, "don't worry, it will grow out."

In addition, it is the basis of all planned treatment—Class I cases can more often than not be treated by quite simple methods. On the other hand,

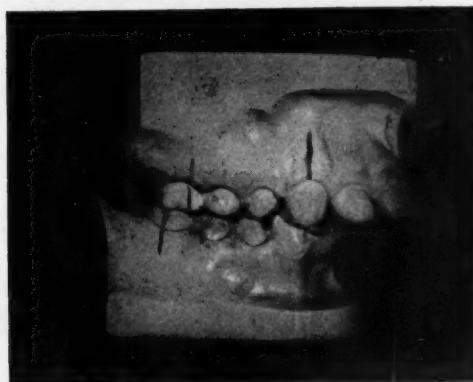


Fig. 6 (b).—Class II. Div. I.

Class II and Class III malocclusions offer many more difficulties in treatment and are not recommended for inexperienced operators. Yet it does not always follow that because upper incisors protrude, as in "buck teeth," the mandible is distal in relation to skull anatomy, *i.e.*, that the case is a Class II. This is illustrated in Fig. 6 (a) and (b). The average dentist might be taught to do

something for (a), for here it is the upper teeth that are too far forward in relation to the skull—they are anxious to assume their correct position given the opportunity. This may be done by extraction. On the other hand, he would have little hope of treating (b), for, in this case, skull pattern is wrong, the mandible itself is distal to skull anatomy and fixed appliances are the only answer. Similarly, because the upper incisors bite lingually to the lowers, it does not follow that the mandible must be forward in relation to skull anatomy as in a Class III. It might well be simply an under-developed premaxillae.



Fig. 7 (a)

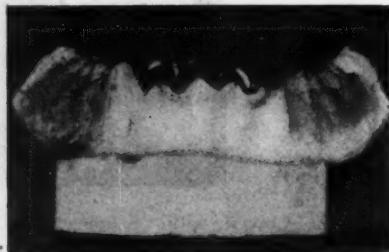


Fig. 7 (b)

Fig. 7 (a).—Pseudo Class III.

Fig. 7 (b).—The inclined plane used for treatment.

The latter will respond beautifully to treatment with an old-fashioned inclined plane which can be handled by any dentist (Fig. 7), but a Class III, except in very early stages, is a tough proposition for even the most skilled operators.

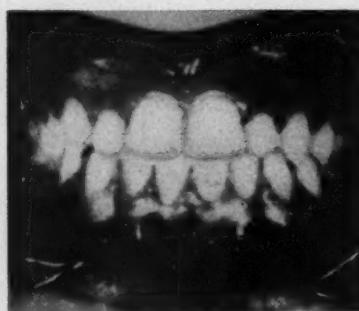


Fig. 7 (c).—Result obtained.

Now we pass to our second postulate:

UNDERSTAND THE ETIOLOGY OF THE DEFORMITY.

This requires some knowledge of (a) Heredity, (b) Evolution, (c) Fundamentals of growth and development of the skull and jaws, (d) Various local etiological factors.

(a) *Heredity.* If a dentist has a parent as a patient with congenitally missing teeth, he must learn to watch for this in the children. He must also recognise that skull pattern may be inherited, and consequently Class II and Class III malocclusions are frequently found in succeeding generations. He should also recognise that, when a malocclusion is the result of inheritance, the prognosis is never as favourable, for one commences treatment with a big handicap, and recent research has demonstrated the limitations of orthodontic appliances in altering the fundamental bony structure of the jaws—one more indication for recognising these malocclusions in their incipient stages and advising or instituting early treatment.

(b) *Evolution.* In the past few years there has been an increasing recognition of the part played by evolution in the development of malocclusion. Gregory⁹ states that the cranium is increasing in size in proportion to the face, and that the face bones are becoming smaller. He suggests that man is in one of the acute transitional periods of his evolution. The frequent failure of some of the teeth in the human dentition to develop would suggest an attempt by Nature to reduce the number of teeth, and that when this is accomplished the accepted formula would be 28 teeth or perhaps less, and the problem of the discrepancy between the size of the teeth and the size of the jaws would vanish. One of the most recent expressions of opinion on this point is found in an article by Hooton¹⁰ on "The Evolution and Devolution of the Human Face" in which he states: "On the whole it seems probable that some reducing trend in facial and dental growth of long standing in evolution is suddenly accelerated and rendered definitely degenerative and pathological when white races come under artificial regimes of city dwelling and when they become dependent upon agriculture and upon cereal diets

It is easy enough for the orthodontist to move teeth, but they must have an adequate bony setting—a firm foundation—if they are to stay put. The extent to which mere readjustment of occlusal relations stimulates reaction in new bone growth to stabilise teeth is doubtful. In many cases it probably does not take place at all." Both Broadbent and Brodie have shown this latter statement to be correct.

(d) *Various Local Etiological Factors.* You have a young patient with crowded teeth, you say to the parent, "They will improve as the patient grows older." How do you know they will? A child aged five has a very deep overbite; the parents may not notice that, but you should. Do you know whether such a condition will improve as the patient grows older, or do you just hazard a guess? Yet only a passing acquaintance with present day knowledge of skull and jaw growth will enable you to answer such questions.

In 1931 Broadbent¹¹ introduced a radiographic cephalometric method that permitted the study of the same living individual over a period of years. It made possible the measurement of the growing head from X-ray films with an accuracy which could only be achieved formerly by direct bone measurement.

9. Adamson, Kenneth T.—Orthodontics for the general practitioner, Aust.J.Dent., 51:141, 1947.

10. Hooton, Ernest. A.—Evolution and development of the human face, Am.J.Orthodont. & Oral Surg., 32:657, 1946.

11. Broadbent, B. Holly.—loc. cit.

By the use of this apparatus it was possible to obtain an identical positioning of the same individual over any interval of time and thus the several X rays so obtained could be accurately compared with each other. This method gave exact information about the direction and the amount of growth but did not show where such growth occurred. For the study of growth site, Brodie¹² added to this another method, namely, the feeding or injecting of a vital stain such as Alizarin Red "S", for which only growing bone has an affinity, and is consequently stained by it. Brodie¹³ states: "from the findings derived from the employment of these two methods, the knowledge of the mode of the growth of the head has been quite completely worked out and can now be applied to clinical problems."

There is not time nor is it necessary to give the full story of skull growth as related by Brodie¹⁴. The points of interest to the general practitioner are as follow:—

1. The general growth pattern is established at three months of age.
2. In the maxillae upward growth occurs at the maxillo-frontal juncture, backward growth at the pterygo-maxillary juncture, and upward and backward growth the zygomatic-maxillary juncture. Combined they lead to a downward and forward positioning of the face.
3. In the mandible the most important growth centre is the superior-posterior surface of the condyle process which, by cartilage proliferation, similar to that of an epiphysis, grows upward and backward and so causes a downward and forward positioning of the entire bone. There is also an active growth centre along the entire posterior border of the mandible and accompanying this there is an active resorption of the anterior border that is almost equal in amount to the growth occurring posteriorly. This keeps the ramus in proportion to the rest of the mandible. In this manner, also, the rest of the mandible is lengthened to make room for the successive eruption of the first, second and third permanent molars. The fact that this machinery appears to break down in some cases before its work is completed accounts for the impaction of third molars. This process is termed by Brodie "resorption modelling."
4. These growth sites are *not* growing at the same rate or the same time, but the contributions made by them work so perfectly together that the total pattern remains remarkably stable from birth to adulthood.
5. All lateral growth of the jaws is completed by approximately 8½ to 9 years of age.
6. There is no increase in length as a result of molar growth between the distal of the permanent lateral and the mesial of the first permanent molar once those teeth have erupted. (See No. 3 above.)
7. There is very little increase in the length of the jaws after the eruption of the second molars. (This helps to decide whether or not third molars will become impacted.)

12. Brodie, Allan G.—On the growth pattern of the human head from the third month to the eighth year of life, A.M.S. Anatomy, 68:209, 1941.
13. Brodie, Allan G. & Slaughter, Wayne B.—Facial clefts and their surgical management in view of recent research, Angle Orthodont., 19:203, 1949.
14. Brodie, Allan G.—*loc. cit.*

8. Thus far, no mention has been made of growth at the alveolar margins, either upper or lower, and the reason is that Brodie¹⁵ has shown that the growth of the jaws proceeds to "within normal limits", whether the teeth are present or not. In the congenital defect known as Anodontia, the maxillae and mandible grow according to the pattern described and the distance between them increases with age until growth is complete. The space so created represents the area that would normally be occupied by the eruption of the teeth and the growth of the supporting alveolar bone. It is interesting to note that nearly 200 years ago, Hunter said, "The alveolar process of both jaws should rather be considered as belonging to the teeth than as part of the jaws, for they begin to form with the teeth, keep pace with them in growth and decay, and entirely disappear when the teeth fall out."

Now, how can we apply these facts clinically?

When teeth are present and they begin to erupt in the normal way, active growth takes place at both alveolar margins, downward in the maxillae and upward in the mandible. Broadbent¹⁶ stated that the ultimate vertical height of the dentition was due to the amount of vertical growth which took place in

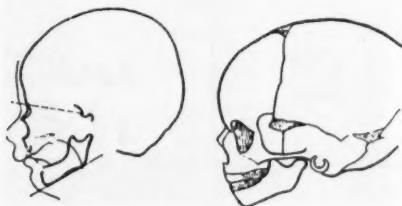


Fig. 8.—Showing contrast in jaw positions at birth. Bayley and Thompson on the left and Broadbent on the right.

these centres so that one might picture the jaws together at birth and then gradually forced apart an increasing amount as the teeth erupt. The more recent and probably correct picture, however, is given by J. R. Thompson¹⁷ who, with Brodie, has demonstrated that at birth the jaws are wide apart and the tongue occupies the entire mouth cavity, extending over the ridge to support the lips. With the eruption of the teeth and growth of the jaws, the tongue, growing at a slower rate, is gradually enclosed by the teeth and the alveolar process (Fig. 8).

This space between the jaws is called by Thompson the freeway space. The position of the mandible "in space" as it were, known as the rest position, is determined by a muscular balance between the depressor and elevator muscles, and is fixed as early as three months. The teeth themselves are only

- 15. Brodie, Allan G.—The growth of the jaw and the eruption of the teeth, *Oral Surg., Oral Med. & Oral Path.*, 1:334, 1948.
- 16. Broadbent, B. Holly—*loc. cit.*
- 17. Thompson, J. R.—The rest position of the mandible and its application to the analysis and correction of malocclusion. *Angle Orthodont.*, 19:162, 1949.

permitted to erupt to a certain distance, pre-determined by this position of the mandible. Beyond this they cannot go.

All this is not merely of academic interest because from it we can answer our own questions.

Let us consider a case of malocclusion in the mixed dentition with crowding in the lower anteriors, a normal depth of overbite, and you hope that it will eventually develop sufficient room to accommodate all the teeth. On what actual facts do you base this hope? Do you expect an increase in length in the mandible to provide this room, and, if so, where? It would have to occur somewhere between the mesial of the first molar and the four permanent anteriors, but we know that growth in length in the mandible occurs at the posterior border only, so that this hope is utterly unfounded. There is never any increase in length in this area unless it is gained artificially, and many query the extent to which this can be done. Can you expect to gain space by lateral growth? No, because lateral growth of the jaws is completed with the eruption of the upper and lower permanent incisors at about eight and one half years of age.

As all the additional length of the body occurs posteriorly, all you have to

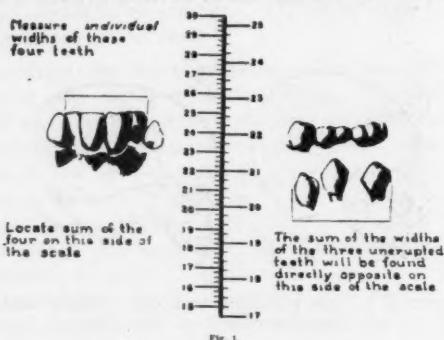


Fig. 9.—Wylie prediction scale.

consider in determining the answer to this question is how much space is available between the permanent incisors and the first molars, and how much space will be occupied by the permanent canine and bicuspids when they erupt. If the latter is greater than the space available, naturally more crowding will occur. If it is less than the space available, naturally the position is bound to improve. If it is equal, it will still be in the same condition as it is at the present time. It is easy to measure the space available between the molars and the incisors with a pair of calipers. It is not so easy, however, to determine the size of the unerupted teeth in question.

There is a very good ready-reckoner available for the general practitioner, in the form of a scale recently published by Wendell Wylie,¹⁸ which is illustrated in Fig. 9. The mathematical formula on which this is based is complicated; however, it is sufficient to say that one can obtain a result within 2 per cent. of accuracy. The method of application is simple. Measure the total width of

18. Ballard, Murray L. and Wylie, Wendell L.—Mixed dentition case analysis: estimating size of unerupted teeth, Amer.J.Orth. & Oral Surg., 33:754, 1947.

the four lower incisors, plot this off on the right hand side of the scale, and the left hand side of the scale will give you the total width of the unerupted canines and the two bicuspids. Compare this with the space available and you have your answer. This is of the greatest value in helping the operator to form an early opinion regarding the necessity for extraction.

Now, concerning vertical height, it would seem that a closed bite is very common to many types of malocclusions in Australian children today. The effect of a closed bite on a developing denture cannot be over-accentuated, but it receives scanty consideration in many cases. There is a significant difference in Broadbent's conception of the development of vertical height and that portrayed by Thompson and Brodie. If we think with Broadbent¹⁹ that the jaws are forced open by the developing teeth and accompanying growth of alveolar bone, then a closed bite in a dentition of a child of three or four is of little significance for we can look for improvement in this condition as the development of the face progresses, and we can say with assurance to the

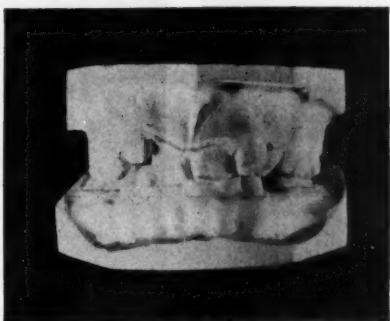


Fig. 10.—Typical closed bite.

parents, "don't worry, this will improve." If, on the other hand, Thompson and Brodie are correct in saying that relationship of the mandible to the maxilla in the vertical dimension is fixed at three months and will not change, then a closed bite even at three years must definitely be recorded as a malocclusion, and must be pointed out to the parents, as well as the effect it will have on the developing denture.

There are two types of closed bites—perhaps it would be more accurate to say that a closed bite can be brought about in two ways: firstly, by a general lack of vertical growth in some of the more important growth centres previously indicated. In this particular type both upper and lower arches are perfectly flat, that is to say, the line of occlusion is more or less flat—there is not much exaggeration of the curve of Spee, no elongation of any teeth, either upper or lower, above the line of occlusion (Fig. 10).

The other type of closed bite is caused by an elongation of the incisors, either in the upper or lower or both, and these teeth are well above the line of occlusion while the vertical height of the posterior teeth is more or less

19. Broadbent, B. Holly.—*loc. cit.*

normal. (Fig. 11.) There is also a third type in which both these former conditions are combined, but it is rare and very difficult to recognise, and for present purposes we will ignore it.

The first type responds very easily to treatment—it is only necessary to encourage natural growth to take place in the areas in which it is deficient. The second type requires the actual depression of the teeth which are elevated beyond the line of occlusion and to do this it requires some type of fixed appliance.

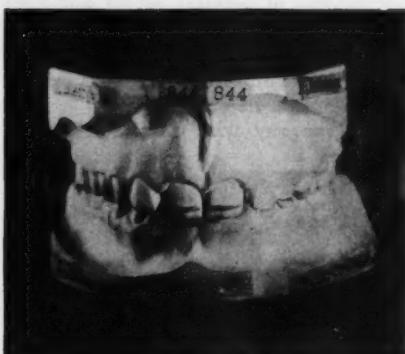


Fig. 11 (a).

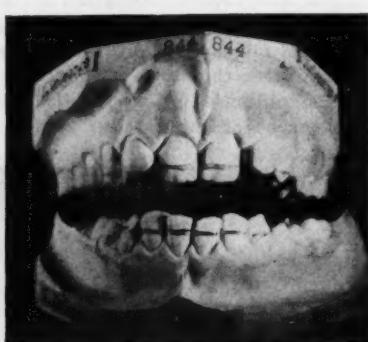


Fig. 11 (b).

Fig. 11 (a).—Closed bite with elongation of anteriors.

Fig. 11 (b).—Same case disarticulated; pencil line shows level of occlusal plane to posterior segments.

We know from clinical experience that the application of a bite plate will bring about remarkable increases in vertical height, but we are not quite sure exactly where this growth takes place, although we can theorise indefinitely. From a practical point of view, however, this is not important—what is important is the effect which a closed bite has on the six anterior teeth in the mandible, in addition to the various traumatic conditions it may produce.

A closed bite literally holds the lower anterior segment of the mandible in a vice, as it were. If this vice-like grip is removed by artificial means (with a bite plate) the teeth will frequently position themselves merely through the process of natural growth and development and stimulation from the tongue muscles (See Figs. 12-17). From these two examples alone we can see how a better understanding of the growth of the jaws can be practically applied in two very common types of malocclusion—crowding of teeth with a normal overbite, and crowding of teeth with a closed bite.

Finally, the dentist must be familiar with the various local etiological factors. Here, after listing them, we can do no more than draw your attention to the most important—time does not permit a detailed discussion of all.

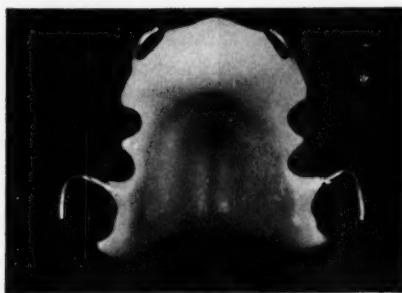


Fig. 12.

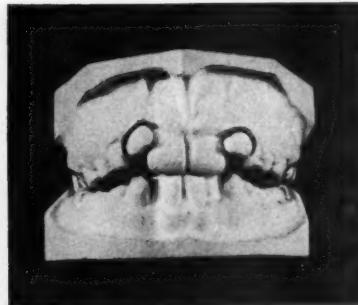


Fig. 13.



Fig. 14.



Fig. 15 (a).

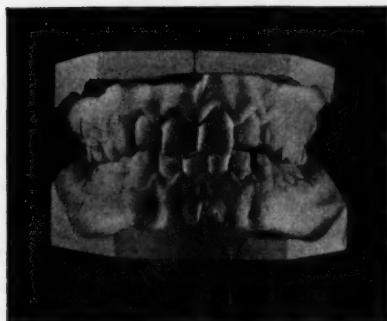


Fig. 15 (b).



Fig. 16.

Fig. 12.—Type of bite plate used to open bite.

Fig. 13.—Illustrating degree of opening of bite when plate is first inserted.

Fig. 14.—Picture of bite plate in mouth. Note stabilising clasps on upper laterals.

Fig. 15 (a).—Showing bite commencing to open as the result of bite plate.

Fig. 15 (b).—Final result of case shown in 15 (a).

Fig. 16.—Showing crowded lower of case illustrated in 15 (a) before bite was open.



Fig. 17.—Showing improved position of incisors as a result of opening the bite and stimulation from tongue pressure.

In and around the mouth proper, termed by Strang²⁰ the intrinsic etiological factors, we find:

1. Premature loss of deciduous teeth;
2. Loss of permanent teeth;
3. Prolonged retention of deciduous teeth;
4. Missing and supernumerary teeth;
5. Abnormal fraenum;
6. Improperly designed dental restorations;
7. Inharmony of tooth size, *i.e.*, freak teeth.

Those factors that are not concerned with the structural demands of the dentition and named by Strang the environmental group, include:

1. Bad habits.
 - (a) sucking habits;
 - (b) mouth-breathing;
 - (c) abnormal swallowing habits;
 - (d) abnormal speech habits;
 - (e) habit spasm (sub-conscious);
 - (f) various other habits associated with the tongue, lips, cheeks and foreign bodies.
2. Abnormalities of the muscle tissues around the oral cavities, the most important of which is hypertrophy.
3. Posterior pressure.
4. Enlarged tonsils.
5. Constitutional diseases such as metabolic diseases, anaemias, allergies, syphilis, etc.
6. Abnormalities of the glands of internal secretion.

20. Strang, Robert H.—Textbook of Orthodontia, ed. 3, Philadelphia, Lea & Febiger, 1943, p. 120.

The important thing is that the dentist should not only be familiar with all these, but should also learn to associate with them the particular types of malocclusion they produce. By this means he will be able to train himself to discover the underlying causes of many malocclusions quite early and so will be able to prevent them from becoming much worse by drawing the parents' attention to the condition, removing the cause where possible, and suggesting simple corrective treatment.

INSTITUTE PREVENTIVE MEASURES.

Once again we only have time to draw attention to the more important, firstly,

Maintenance of the deciduous dentition.—The importance of maintaining a sound deciduous dentition has been stressed time and time again. The fact that the general public regard the deciduous teeth as of little importance can probably be blamed to a large extent on the habit of some of referring to this dentition as a "temporary dentition." Such a name must help to convey the wrong idea and infer that they are only temporary and hence of no importance. They have a limited life in the jaw but they should live it to the full.

The institution of any dental scheme beginning with the pre-school-age child should enable us to maintain the deciduous dentition in a very much healthier condition than before, but there is still far too much tendency for dentists to remove deciduous teeth rather than fill them, even when this is a clinical possibility.

Premature loss of deciduous teeth.—The effect of the premature loss of deciduous teeth is well known. The loss of space which invariably follows this, especially when it occurs early in the denture history, is the beginning of many cases of malocclusion, and a complication which is added to many others. Sometimes deciduous teeth must be removed for clinical reasons, but the dentist should see to it that this does not result in a drifting of the neighbouring teeth.

The use of a simple type of space retainer can prevent this. Whether or not it is necessary to use a space retainer in every case is a subject which could be a paper in itself²¹, but for general purposes it is sufficient to say that a space retainer should be used in most cases where the permanent successor has not yet broken through its bony crypt. The exceptions to this are the mandible in a Class III where no space retainer is ever necessary, and in those cases where there is a big discrepancy between tooth size and basal bone—a condition which will eventually necessitate the removal of some teeth in the course of treatment. The average case should be checked quarterly by measuring the spaces with calipers and, if there is any suggestion of loss of space, a space retainer should be inserted.

Prolonged retention of deciduous teeth. It is a well-known fact that prolonged retention of deciduous teeth will deflect and displace their permanent successors (Fig. 18). If a careful examination of the mouth is made this possibility should never arise. The deciduous tooth should be removed as soon as there is any sign of the permanent tooth, or even beforehand if the dentist

21. Adamson, Kenneth T.—Space retainers, Aust.J.Dent., 52:147, 1948.

suspects either from clinical examination or X-ray that it is in any way interfering with the eruption of the permanent tooth.

Detection and correction of bad habits such as thumb-sucking, nail-biting, tongue-biting, speech-habits and mouth-breathing.

All of these habits bring in their turn particular types of malocclusion, and the dentist should learn to associate these types of habit with the particular

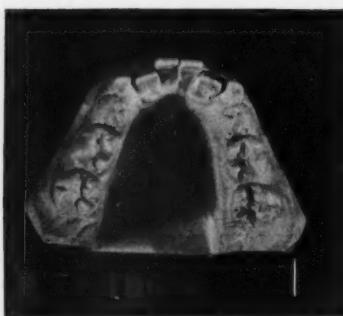


Fig. 18.—Illustrating the displacement of permanent teeth as the result of prolonged retention of deciduous teeth.

type of malocclusion, so that when he sees the malocclusion he should also be able to detect the habit which produced it.

Thumb-sucking, which usually produces the typical malocclusion shown in Fig. 19 is a difficult problem to overcome. If the habit can be broken before

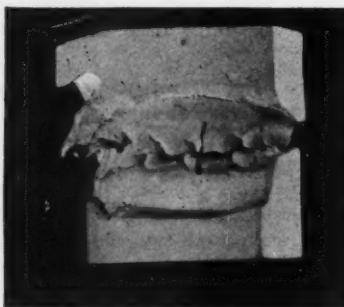


Fig. 19.—Illustrating typical case of thumb-sucking.

the age of five years, the malocclusion will nearly always correct itself provided that it is not accompanied by incorrect mesio-distal pairing of the upper and lower teeth in the lateral segments. It is always a psychological problem and should be thought of as such. The reason for the child sucking his thumb is just as important as the method of stopping it. In a young child insufficient food, in the slightly older child insufficient parental devotion, and in the

adolescent the continuation of a habit already established in youth, are basic principles often involved. Any mechanical restraint placed on the child to prevent it carrying out this habit should not be tried until every effort has been made to overcome the basic fault, and then only with the co-operation of the child who should be made to understand that the operator is trying to help him to help himself and is in no way attempting to punish him for actually sucking his thumb. In addition to breaking the habit, the incisal relationship should be corrected so as to make it possible to establish normal lip function and mouth-breathing. This can easily be done by carrying the upper incisors lingually with the appliance illustrated in Figs. 20, 21, and 22. The principle of this plate is simple: the finger-springs are so adjusted that they press against

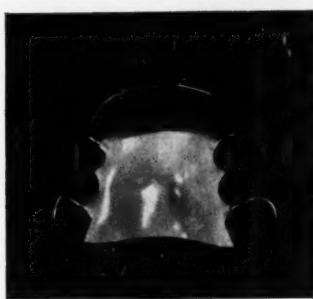


Fig. 20 (a).

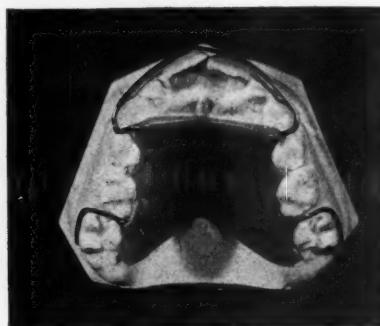


Fig. 20 (b).



Fig. 21 (a).

Fig. 20 (a).—Plate used to correct protrusion of incisors in thumb-sucking.

Fig. 20 (b).—Showing adjustment of the plate in relation to the incisors.

Fig. 21 (a).—Mouth before plate is inserted.

the labial surfaces of the upper incisors and carry them lingually. The points to remember in using this appliance are, first, do not move the teeth too quickly. The finger-springs when passive should rest against the lingual surfaces of the incisors and be readjusted once every six weeks. Secondly, when the plate is

cut back from the upper incisors, the free margin of the plate must be rounded and thickened—this prevents it cutting into the palate.

Nail-biting is one of the most difficult habits to overcome, and can only be done by earnest appeal to the patient himself.

Tongue-thrusting and tongue-biting. These are habits which are best treated by a thorough understanding being established between the patient and

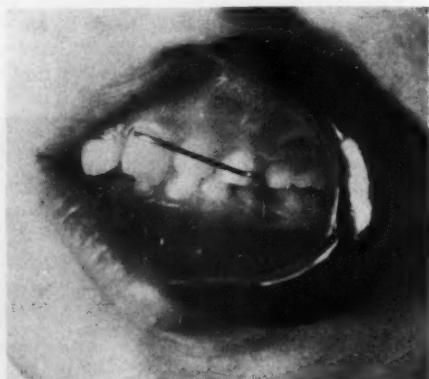


Fig. 21 (b).

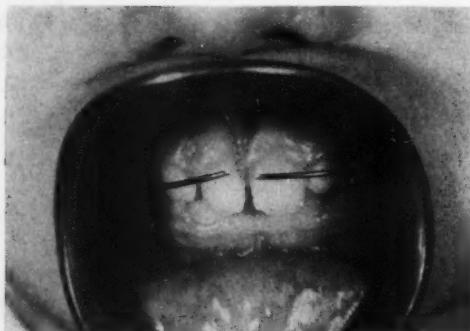


Fig. 21 (c).

Fig. 21 (b).—Plate inserted—side view.

Fig. 21 (c).—Plate inserted—front view.

the operator. Small dentures can be employed with various forms of filigrees of wire, fixed just lingual to the upper anteriors which will prevent the tongue from coming into a forward position (Fig. 23). Again, it should always be explained to the patient that it is designed to help him, and not to hinder him. Muscular exercises may also be employed but the success of these largely depends upon the degree of co-operation of the patient.

Speech-Habits. It is always advisable to employ the help of a properly trained speech therapist who can be invaluable in these cases. They are also of great value in controlling some tongue habits.



Fig. 22 (a).

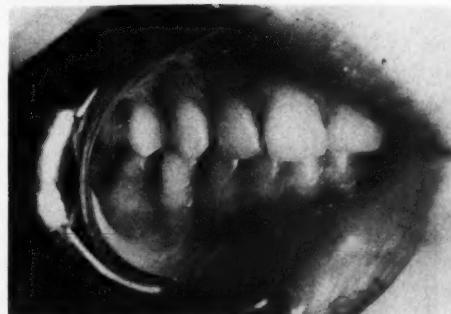


Fig. 22 (b).



Fig. 23.



Figs. 22 (a) and 22 (b).—Front and lateral view of finished case. No other appliances used.

Fig. 23—Illustrating self-correction of the malocclusion resulting from tongue-thrusting and biting, after the habit has been checked by the appliance shown.

Mouth-Breathing. When well established, this habit cannot be overcome until some correction of tooth position has been made in the incisal region, for the lips are nearly always held apart by a protrusion of the upper incisors and it is mechanically impossible for the patient to close his mouth until these have been retracted. Once this has been done some support can be given to the



Fig. 24.

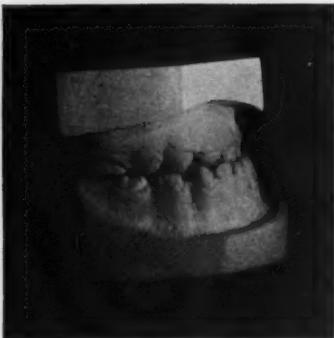


Fig. 25 (a).

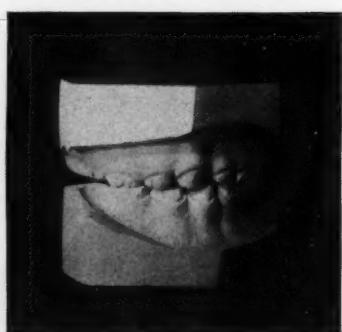


Fig. 25 (b).

Fig. 24.—Patient wearing chinstrap in early Class III. case.
Figs. 25 (a) and 25 (b).—Before and after twelve months' application of a chinstrap.
Patient aged 3½ years.

mouth at night by applying a small amount of sticky cellulose tape placed diagonally across each corner of the mouth. The institution of regular deep breathing during the day is invaluable, making sure the lips are always firmly closed during this process. The use of oral screens is also recommended for those who will tolerate them. Remember that the habit persists after tonsils and adenoids have been removed and will always need treatment as outlined above.

Abnormal Fraenum. We have mentioned this previously, and it is only necessary to say here—be sure it is abnormal, and then follow some recognised surgical procedure for its removal; the mere snipping of the fraenum is quite ineffective.

Early treatment of Class III malocclusion. Whilst this is one of the most difficult types of cases to treat when established, and one which at the best has a most unsatisfactory prognosis, the dentist can do a great deal to improve and reduce the degree of deformity if he institutes some interference in the early stages. One of the most effective methods of doing this in the very young child is the use of a headcap and chincup illustrated in Fig. 24. The results which can be obtained are shown in Fig. 25.

Another great help in the early treatment of these cases is biting on a wooden tongue spatula. In a small child, the mother holds this in the mouth against the lower teeth and has the child clench the upper teeth firmly on it. This should be done for 10 minutes per day. If neither of these methods produces a satisfactory result, it is necessary to resort to fixed appliances and, while they again in the early stages are of a comparatively simple nature, they are difficult to handle without experience.

PERFORM SIMPLE CORRECTIVE MEASURES.

For the purpose of this paper, we intend to avoid any reference to fixed appliances. It is considered that they are not effective in the hands of the general practitioner unless he has undertaken post-graduate study.

What simple methods have we at our disposal—we have already said something of prevention—what of denture guidance?

In the case of an overcrowded mouth, extraction alone may be effective in some cases of Class I malocclusion, provided that the bite is not closed, but in most instances some guidance must be given to the remaining teeth to obtain the best results. This is best accomplished with a removable appliance.

Before we proceed any further, may I quote from an article written by the French Orthodontist, De la Barre, in 1815, "It is much easier to extract teeth than to determine whether it is absolutely necessary. The extraction of a tooth requires nothing more on the part of the practitioner than a degree of facility in the use of instruments that are usually employed in this operation; whilst the knowledge necessary to appreciate the consequences can only be acquired by time and study." May we keep this always in mind before we extract a tooth simply because it is out of line in the dental arch. There are certain principles or maxims relating to the extraction of teeth in the mouth and which may be enumerated as follows:—

1. After extraction the subsequent drift of teeth on either side of the space will occur at a much greater rate in the maxillæ than in the mandible.
2. Although a space may be eliminated by the mesial and distal movement of the teeth on either side of the space, the tooth or teeth moving mesially will move faster and farther than those moving distally.
3. If a tooth be extracted in the mandible the tendency for the space to be closed by the subsequent drifting of the teeth on either side of the space is greatly diminished after the age of twelve years, resulting in partial or total failure of the space to be eliminated.

4. Because of the cancellated nature of the bone in the maxillae, drifting of the teeth caused by extraction will continue in these bones several years later than in the mandible.

5. The extraction of any tooth or teeth tends to produce a closed bite, which will vary in degree according to the age and the area from which the tooth or teeth have been removed.

6. In cases with marked closure of the bite, the drift of teeth subsequent to the removal of teeth may be greatly impeded or even eliminated according to the amount of cuspal interference.

7. An unerupted tooth will migrate through the bone more rapidly than an erupted tooth.²²

If you will remember these rules and apply them, it is surprising what a little thought and one small denture will do!

We would refer in particular to the extraction of 1st molars and 1st bicuspids. We are all familiar with a Class I malocclusion where there is crowding in the incisal area in both upper and lower jaws. The etiology of these cases is frequently a discrepancy between the tooth size and the development of basal bone. It has recently been stated²³ that the mandible is more able to accommodate the teeth placed in it than the maxillae—there is no scientific foundation for this statement, and it is certainly not born out clinically, for all of you see a large number of cases with well-formed maxillary arches and crowded lower arches; particularly is this so when there is a deep overbite. To attempt to fit 32 teeth into the basal bone provided is rather like trying to push a size 12 foot into a size 9 shoe. The answer is the reduction of the number of dental units, but it must be done by removing the right tooth at the right time and guiding the remaining teeth into their correct position—*both of these are equally important*. It is useless to let the malocclusion develop to its fullest extent and then hope to improve it by haphazard extraction of various dental units. You must work out your plan early in denture history.

Additional space is best provided in these cases by the removal of either the 1st permanent molars or the 1st bicuspids and the choice between these teeth depends on two things: firstly, the amount of space it is required to gain—the removal of first molars will give you more room than the removal of the first bicuspids—and secondly, the dental condition of the teeth. One would not consider the removal of perfectly sound first bicuspids and leave heavily filled first permanent molars in position.

The removal of the first bicuspids.—These are possibly the first choice. As stated by Chapman²⁴, these seem to represent the nodal points in the arch towards which both the anterior segment and the distal segment migrate. This is a most important point to remember because some mesio-distal adjustment of the arch can sometimes be gained by checking the drift of the teeth in one direction or another by means of a small denture. The most important

22. Adamson, Kenneth T.—Orthodontics for the general practitioner. *Aust.J.Dent.*, 51:150, 1947.
23. Heath, John S. R.—Planned minimum orthodontic treatment. *Aust.J.Dent.*, 53:286, 1949.
24. Chapman, Harold.—Orthodontic extractions as part of treatment, *Internat.J.Orth., Oral Surg. & Radiography*, 18:581, 1932.

thing to remember about the removal of these teeth is that they should be done early in the denture history, by this we mean, as soon as they erupt. Their removal before eruption, as has been advocated by some writers, frequently proves to be a two-edged sword, particularly in the maxillae, as it does not enable one to control the subsequent drift of teeth on either side of the space so created.



Fig. 26.



Fig. 27.

Fig. 26.—Case illustrating result that can be obtained by correct timing of bicuspid extractions.

Fig. 27.—The type of malocclusion that can be prevented by well-timed bicuspid extractions.

A great deal of criticism has been levelled at the removal of the first bicuspids on the ground that it nearly always leaves a space which does not completely close but, if this occurs, it is because the teeth have been removed too late or unnecessarily. Fig. 26 shows the result that can be obtained with correctly timed extractions, Fig. 27—the type of malocclusion that can be prevented by such extractions.

First permanent molars. These are the most important teeth in the dental arch. Unfortunately in this country they are often carious and heavily filled. If it is felt that their life will only be a brief one, they should be removed before the dentition is completed. The time and method of their removal will be determined by the type of malocclusion with which you are dealing.

If the malocclusion is an ordinary Class I, with no mesio-distal discrepancy, it is the correct procedure to remove all four at the one time but, if possible, not too early. The ideal time is when the bicuspids are fully erupted and just before the eruption of the lower second permanent molars. This should be possible according to our chronological table of teeth eruption, but in actual practice such a condition rarely presents.

The important thing to remember is that the mandibular first permanent molars should be removed prior to the eruption of the second permanent molars. If this is not done, the second molars will not move forward evenly but will tip towards the mesial in the place previously occupied by the first molar and a food pocket will be formed between the mesial surface of the second molar

and the distal surface of the second bicuspid. It is also important to remember that if the molars are removed in the mixed dentition a bite plate *must* be employed to control the vertical dimension during the transition period from mixed to permanent dentition. Sometimes, due to the irregular eruption of teeth, the eruption of the second molars is so advanced as to necessitate the removal of the first molars before the completion of the eruption of the bicuspids, and once again in these circumstances a bite plate must be used.

If a molar is lost in one jaw on one side in a Class I case and the teeth are in normal mesio-distal relationship, in order to maintain a balanced occlusion a corresponding tooth should be extracted in the opposing arch, but X-ray the third molar area before this is done, to make sure that one is not reducing the masticatory area in that region to one molar only, as has frequently been done due to the absence of third molars.

In Class I cases with the upper mesial, it is possible to produce a most spectacular correction of this malocclusion with two dentures and the extraction of upper first permanent molars. The only stipulation is that the case shall be a true Class I with the upper mesial and not a Class II, and the bite must not be closed. The procedure is to remove the two first permanent molars from the upper arch after the second molars have erupted. A bite plate is then made holding the second molars distally and propping the jaws apart by means of a bite plate behind the four upper anteriors so that there is no cuspal interference. The plate is stabilised by two clasps around the laterals for some months, when the upper right left 3, 4 and 5 will drift distally till they assume their normal mesio-distal relationship with the lowers, after which the clasps can be removed and the second molars allowed to drift forward into normal contact with the distal of the second bicuspids. During this process a new plate is made with finger-springs brought around on to the front of the upper incisors and they are brought back to normal relationship with the lower teeth. This process is illustrated in Figs. 28-31.



Fig. 28.

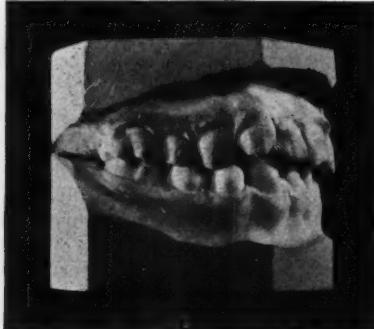


Fig. 29.

Fig. 28.—The type of case which can be corrected by correctly timed extractions of upper first permanent molars.

Fig. 29.—Illustrating stage where distal drift of lateral segments is almost completed.

This is denture guidance plus simple appliances at its best—not an ideal treatment, but it has a definite place in mass orthodontics.

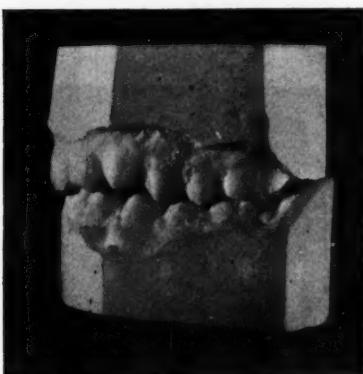


Fig. 30.



Fig. 31.

Fig. 30.—Distal drift of lateral segments complete and incisors retracted with plate similar to that used in thumb-sucking.

Fig. 31.—Illustrating principle of controlled drift; clasps can be seen around the bicuspid checking any further distal drift of right 3, 4 & 5, and allowing the right 7 to move forward into correct articulation.

To remove all four first molars at this one time in Class I cases with the upper mesial is wrong. The malocclusion is not improved and the patient has lost four teeth. Now the only remedy is to use fixed appliances (Fig. 32).

There are many other forms of denture guidance available which the general practitioner can learn to work out for himself, but unfortunately our time does not permit us to discuss these in great detail.



Fig. 32.

Fig. 32.—Showing first molars removed in similar case without any attempt at controlling the drift of the teeth. The malocclusion is as bad as before.

Unlocking of the upper incisor from its lingual position in relation to the lower teeth can be easily accomplished, if there is space for the tooth, by the use of the simple plate illustrated in Fig. 34. Similarly, protruding laterals or protruding canines can be moved back into place, providing there is space for them, by the use of the appliance illustrated in Fig. 33. It is always im-

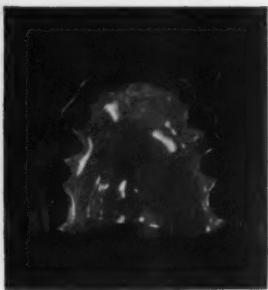


Fig. 33.

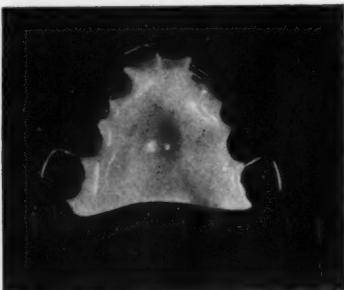


Fig. 34.

Fig. 33.—Type of plate used for retracting protruding lateral incisors or canines.

Fig. 34.—Type of plate used for labial movement of any teeth in the maxilla. Note stabilising clasps and S springs.

portant to remember that none of these appliances will work where there is insufficient room. This room can sometimes be gained by extraction, applying the principles referred to previously.

Early elimination of cross-bite is another important form of denture guidance, but once again time does not permit of a detailed discussion of this factor.

One can do little more than illustrate a principle in a lecture of this nature, and if I have succeeded in doing this I will feel reasonably satisfied. May I conclude by asking for your earnest co-operation in this most important branch of children's dentistry, for it would seem that there is no other way of touching the vast number of malocclusions which at present go untreated. Will you help us to help you?

BLACK TONGUE.

CASE REPORT.

H. A. MUELLER, B.D.S.

The patient, a woman approximately 35-40 years of age, was referred to me by a medical practitioner. She presented with a black, hairy type of tongue in the posterior region (posterior two-thirds) and complained of an unpleasant taste in her mouth.

HISTORY:

The patient had for some years worn a partial upper acrylic denture with no posterior palatal portion without discomfort or appearance of black tongue but, when she wore a full upper denture covering the posterior portion of the palate, she developed the black tongue condition. After leaving out the denture for a week, the black tongue disappeared completely, but returned when the denture was re-inserted.

The denture was processed at the processing temperature (170°F.) to ensure that no uncombined monomer remained; and then, after a short period of use, the signs and symptoms re-appeared.

The patient was referred to the United Dental Hospital, Sydney, where careful tests for any gastro-intestinal disturbance were undertaken.

The result of these tests was negative.

After an interval of some five months, the patient was again examined and the black condition was still present, though slightly less pronounced than formerly, and she said the unpleasant taste had practically disappeared. This respite appeared to be a temporary phase only, as the condition still persisted.

THE ARTICULATOR

Members of the profession are notified that copies of the 1950 edition of "The Articulator" will be available in October, and can be obtained on application to the Honorary Secretary of the S.U.D.U.A., Dental Hospital, Sydney, at 3/6 each.

DENTISTRY IN MALAYA.

REPORT BY NURIDDIN BIN MODH SALLEH.*

INTRODUCTION.

The history of dentistry in Malaya, in the modern nomenclature of Dental Science, does not date very far back. Prior to the adoption of western dentistry one can trace from history the primitive native method of cleaning the teeth with fresh twigs, husk, charcoal, sand and many other forms of abrasives or gritty substances. As caries has been known since the origin of mankind, the unrecorded mode of allaying pain from an aching tooth was to stuff the cavity with ground flower of cloves mixed with lime or to smoke the dried twigs of the chili plant. Another common remedy was to pack the carious tooth with leaves of the poppy plant.

Scientific prosthesis was unknown. The only mechanical restoration ever recorded was the carving of dentures from ivory, horns, shell and cast gold. Preservation of teeth was accomplished by using the oil extracted from nut-shell mixed with wolfram and smeared on the teeth. This was often seen and occasionally met with in the remote area of the country, especially among the aborigines. It left a black, dull, tenacious staining which was believed to give a protective covering to the teeth.

After World War I, when Malayan tin and rubber stepped into the world market and when modern development and scientific expansion was the rule of the century, some adventurous English and Western-trained dentists opened private practices in Singapore and at one or two towns in Malaya. These pioneers found that the material was in abundance, the scope was boundless, and the returns were fat and plentiful! They found they had to compete with a host of ideograph-educated, unscientific, mechanical, oral artisans whose ingenuity was inborn in their race and whose more glittering results were achieved with much less labour.

After attaining maturity and conscious of its responsibility, the government realised the importance of the science to the general health of the population and, in order to protect the swarms of the "Dento Smith" artisans, introduced an enactment which required that anyone practising dentistry in Malaya should be registered. Hence, in that country at present there are two types of dentist:

- (a) The registered dentist.
- (b) The qualified practitioner.
- (a) *The registered dentist.*

This category of highly skilled artisans is commonly known as "Toekang Gigi." These untrained, unqualified, remarkable men have usually started as assistants to their predecessors and/or have been carrying on the trade which has existed in the family for generations. A great majority of them are Chinese, some are Japanese, and there are a few Indians and Indonesians. They are to be found almost everywhere in the towns and small villages through-

*Commonwealth UNESCO Fellow working at Melbourne Dental Hospital, holds Licentiate in Dental Surgery from Medical College, Singapore.

out the country. They carry on their business—practical gold-moulding method—often in conjunction with a goldsmith, by all manner of unscientific and unhygienic reconstructions imaginable: from crowning a loose stump to a pontic on a partly erupted tooth; from the layer of one two-thousandth of an inch foil to the thickness of sovereign gold plate.

(b) *The qualified practitioner.*

These are scientifically trained personnel. They are graduates of Universities or Colleges, and possess a Degree or Diploma registrable in the Dental Board of the United Kingdom. Many of them are graduates of the King Edward VII College of Medicine and Dental Science, but there are others who had their training in America, Europe and Japan.

DENTAL FACULTY OF THE KING EDWARD VII COLLEGE OF MEDICINE, SINGAPORE.

True, this is not a chronological report, but the honour of being the man who laid the firm and sound foundation of the Faculty of Dental Science in the College goes to the indefatigable Professor E. K. Tratman. At that time he was the Professor of Dental Surgery of the Medical College and Consultant Dental Surgeon of the General Hospital, Singapore. Through his untiring effort and the firm support of his numerous colleagues, particularly Mr. C. F. Mummary, and a host of other officials in the medical services, as well as the solid stand taken by the College Council and the generosity of the Government, the Faculty of Dental Science was established in 1926.

Following its elder brother—the Medical College—this new branch was nursed, fed and brought up in the same manner and modelled on Dental Schools in England. The curriculum, syllabus, prerequisites and even the material and the teachers are practically 100% British; the subjects, however, are mostly Asian. It is a matter of insemination of Western knowledge into the Eastern mind.

ACADEMIC TRAINING.

The minimum period of training is five years. The first year is spent in the study of Science — Physics, Chemistry, Biology, including Zoology and Parasitology, and Practical Dental Mechanics. A student, after attaining a certain standard of efficiency and ability, would begin his second year in the study of Organic Chemistry, Biochemistry, General Anatomy and Physiology, in addition to his Practical Dental Mechanics. Having passed his second professional, the student attends the course in Materia Medica and Pharmacology, Bacteriology, Pathology and Histology, Dietetics, Metallurgy, Optics, Practical and Conservative Surgery. Then comes the fourth year with lectures in General Medicine and Surgery, Anaesthetics, Radiology, Ethics, Orthodontics, General Nursing and Special Oral Surgery and Pathology A, in addition to Dental Hospital practice; in the final year—more specialized teaching and more work in Dental Hospital practice, and Clinical Medicine and Surgery in relation to Dental Surgery. Specialty becomes the grind and stepping-stone of the student's final year.

Altogether, a student is expected to devote at least 4,000 hours to practical work—2,000 for Hospital practice and 2,000 for Practical Dental Prostheses—in addition to the regular curriculum to be followed.

After the completion of the strenuous years at the College, a graduate steps into the business world as a private practitioner or in public service, with a mission for the alleviation of human sufferings, the promotion of the profession, and the practice and dissemination of the teaching of Aesculapius.

THE PUBLIC DENTAL SERVICE.

This branch of service is ancillary to the already well-established medical services. It is centrally administered by the Chief Dental Officer who is in turn formally responsible to the Director of Medical Services (somewhat akin to the Minister for Health).

There are more than forty government dental clinics scattered throughout Malaya and they are usually attached to hospitals. Treatment is rendered and provided for the needy and poor and for those who cannot afford the services of a private practitioner. The majority of these government-employed personnel work in specified regions or areas. Their prime duty is to attend to the children of pre-school and school-going age up to twenty-one years and to pre- and post-natal mothers. Often they have to travel many miles into the country, where a river is the only means of access, to continue the treatment. Hospitalized and elderly patients are also attended. Many of the general public are treated for the immediate relief of pain, often in face of transport difficulties.

CONCLUSION.

It is with great optimism that I say that, in spite of the setback during the last Pacific War, the spirit imbued in the work accomplished and the principles transmitted through the initial hazardous years are steadily and definitely appreciated by the general public. Confidence in this science of treatment, the art of mending, the method of teaching and infusing the value of dental and oral health in relation to the moral and physical well-being of the citizens of the State calls for the co-operation of all—an investment that would be harvested in healthy and happy beings, useful members of society.

DENTAL MATERIALS**CURRENT NOTES (No. 2).*****Burs and Points:**

Work is well under way at the Commonwealth Bureau of Dental Standards in the development of test methods for steel burs and in this regard considerable help has been received in the past from U.S. authorities and firms. Of interest are the recent papers of Larsen¹ of New York which refer in particular to tungsten carbide burs and diamond points and their demonstrated superiority over steel and carborundum instruments. The author gives details of the proper selection of instruments and the technique of their use which are necessary to ensure maximum efficiency.

Some Amalgam Data:

A survey organised in the U.S.A. has shown that amalgam restorations consume the greatest single share of the dentist's time². The proportion of time devoted to alloy fillings averaged 22 per cent. compared with 11 per cent. for full dentures and 9 per cent. for silicate fillings. The frequency of such restorations naturally provides a fertile ground for statistical research, the latest being concerned in the amount of mercury retained. Phillips and Swartz³ report an average mercury content of 45.4 per cent. for 100 restorations, although variations from 28 to 61 per cent. were noted. It is pointed out that, with care, the amount of mercury remaining in restorations can be minimized, thus assuring maximum strength and resistance to tarnish. Mosteller⁴, who also reminds us that excess mercury will cause darkening in spite of polish, makes a plea for thoroughness in finishing and polishing amalgam restorations and advises how this is best achieved.

The Bureau of Dental Standards now has very accurate equipment for measuring the dimensional changes of alloy specimens held at a temperature of 37°C. Interferometers are used following the general principles employed at the U.S. Bureau of Standards, and changes in length of less than one micron (40/millionths of an inch) can be observed. This is essential as Australian Dental Standard No. T.2 requires an expansion of 2 to 15 microns per cm. at the end of 24 hours. The only other such equipment in use in Australia was designed and built by Mr. A. Busby, of Glover & Goode Pty. Ltd.

Silicate Cements:

The first revision of American Dental Association Specification No. 9 for Dental Silicate Cement, which will become effective this year, has been published⁵. Some changes have been made in the test methods and requirements

*Contribution from the Commonwealth Bureau of Dental Standards.

1. Larsen, N. L.—Efficient Use of Carbide Burs and Diamond Points for Cavity Preparation. *Dental Digest* 55:442-8, 495-502 (Oct., Nov., 1949).
2. Anon.—Alloy Fillings Consume Greatest Single Share of Dentist's Time. *Dental Survey* 25:1643-5 (Nov., 1949).
3. Phillips, R. W. and Swartz, Marjorie L.—Mercury Analysis of One Hundred Amalgam Restorations. *J.D.Res.* 28:569-72 (Dec., 1949).
4. Mosteller, J. H.—The Finishing of Alloy Restorations. *Dental Digest* 56:15-17 (Jan., 1950).
5. Paffenbarger, G. C., et al.—A.D.A. Specification No. 9 for Dental Silicate Cement: First Revision, Effective July 1, 1950. *J.A.D.A.* 40:186-93 (Feb., 1950).

and this information has come at an opportune time in view of the proposed activities of the recently formed Standards Association Sub-Committee on Cements.

Hydrocolloids:

Another Australian Dental Standard under critical consideration at present is one for hydrocolloidal impression material, and here also a timely paper by Cresson⁶ has come to hand. Through previous communications with the author it has been possible to incorporate some of his suggestions in the draft specifications. For example, it is proposed to substitute a requirement for set after a given strain instead of after a given stress as in the present A.D.A. specification. This is more in keeping with conditions in actual practice where the degree of undercut and not the stress induced in the impression material during withdrawal is the basic factor.

While on this subject, attention should be drawn to another useful contribution from Skinner and his colleagues⁷ on hydrocolloids both agar and alginate types. The authors conclude that most modern (U.S.) hydrocolloidal materials whether reversible or non-reversible were equally capable of producing accurate impressions. A rational technique is presented for each type to ensure the most satisfactory results but full details cannot be given here. One conclusion was that for best results *the model should be poured immediately after the impression has been obtained.*

Two recent clinical papers^{8,9} show how useful the reversible hydrocolloids in particular can be for indirect restorations ranging from inlays, small bridges to complex full mouth reconstruction. Both stress the consequent reduction in chair time and tension for patient and practitioners alike.

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6. Cresson, J.—Suggested Revisions for Testing Dental Elastic Impression Materials. *J.D.Res.* 28:573-82 (Dec., 1949).
 7. Skinner, E. W., et al.—Reversible and Irreversible Hydrocolloid Impression Materials. *J.A.D.A.* 40:196-207 (Feb., 1950).
 8. Thompson, M. J.—Reversible Hydrocolloid Impression Material: Its Treatment and Use in Operative and Prosthetic Dentistry. *J.A.D.A.*, 39:708-20 (Dec., 1949).
 9. Schaffer, J.—Hydrocolloids for Indirect Inlays. *Dental Digest* 55:550-5 (Dec., 1949).



The DENTAL JOURNAL
of AUSTRALIA
EDITORIAL DEPARTMENT

BONE

Bone, the skeletal foundation around which is moulded the soft tissues, provides a mechanical structure upon which the human physiology can function and thus has an important place in dental surgery.

The dental surgeon will find in very few cases that he can disregard the particular characteristics and qualities of bone. Certainly, in oral surgery few operative procedures can be undertaken without some interference with the bony structure.

It is extraordinary that in many cases large portions of bone may be traumatized in operative procedures in the mouth, and yet very little clinical evidence appears of unfortunate sequelae.

In general, it may be said that, where a wound is made in the tissues, it is essential that it be closed promptly provided, of course, that there are no foreign bodies enclosed in this wound. The closure protects the blood clot which forms rapidly and ensures the immediate operation of the repair mechanism whereby the continuity of the tissues is restored. However, where a tooth is extracted, the opportunity of closing the wound is lessened, especially if the extraction of the tooth is undertaken by means of forceps, and even where so-called surgical removal is undertaken there is a tendency for a space to be left in the wound which must perforce be filled with a blood clot; as the saliva and fluids which are taken into the mouth may rapidly disturb this, the chances of an uneventful recovery are somewhat lessened.

There have been many attempts to develop procedures for avoiding these cavities in the alveolar bone, some designed upon the use of gelatin as a base with haemostatic agents or antibiotic agents incorporated. More recently the salts of alginic acid have been developed and, by their action in rapidly causing clotting and firmly sealing the wound over, have done much to remove many of the painful and disconcerting reactions following surgery in the mouth.

Lately, an attempt has been made to extend the use of some of these agents to the stage where alterations to the form of the alveolar bone may be effected. All are familiar with the picture of the edentulous mouth in which unfortunate protuberances of bone remain in certain areas of both upper and lower jaw

or the rapid resorption of the alveolar process to the stage where a sharp ridge of bone remains to disconcert the prosthodontist.

Some attempts have been made, however, to overcome this difficulty and recently a clinical investigation has been undertaken to determine the value of "sub-periosteal synthetic bone implantation."* The rationale of the procedure is the use of gelatin base with mineral salts added more or less on the basis of the mineral content of the normal bone; these implants are placed beneath the periosteum and the gum tissue is replaced and lightly sutured, avoiding tension on the soft tissues, the aim being that in the process of repair and osteogenesis the implant may be substituted by heavy tissue or dense connective tissue of a texture adequate for the retention of the denture. To date the investigation shows great promise and it is left to clinical observation to determine the extent and duration of such implants and whether the ultimate picture is completely one of bone regeneration in the particular area. However, in the light of present knowledge, the investigation shows that the method is a satisfactory one of eliminating so-called undercut alveolar ridges without necessitating the removal of over-hanging bone.

In the lower jaw the degree of deposition seems to vary inversely with the amount of muscle tone in the lower lip and post-operative discomfort in the cases examined has been negligible. The new tissue appears to be definitely bone.

If this method can be developed, and in the light of present knowledge there appears to be nothing against its use, considerable advantage should accrue in the fields of prosthodontia.

*W. E. Costigan, North Western University Bulletin, 50:12, March, 1950.

News and Notes

WESTERN SUBURBS DENTAL GROUP

On Tuesday, 18th July, 1950, the Western Suburbs Dental Group held their Twelfth Annual General Meeting at "Wyoming", Strathfield. Despite the very inclement weather there were 55 members and visitors present, including representatives from the Blue Mountains Division, the St. George Dental Association, and the Eastern and Northern Suburbs Dental Groups.

A most successful year for the Group was brought to a conclusion by the election of Officers and Committee, which resulted as follows:—

President: Mr. R. G. Leeder.

Patrons: Dr. J. S. Baird, Dr. E. R. Magnus.

Past-President: Mr. R. V. Hawthorne.

Vice-Presidents: Mr. F. Dennett, Mr. H. Osborne.

Hon. Secretary: Mr. R. Dennett.

Hon. Treasurer: Mr. D. Steele.

Committee (elected by ballot): Dr. R. Cloutier, Mr. B. Maundrell, Mr. L. Kluver, Mr. H. Croxon, Mr. R. Norton.

ROYAL NEWCASTLE HOSPITAL

A vacancy exists for an Assistant Dental Surgeon on the staff of Royal Newcastle Hospital, offering experience in all phases of dental practice. Salary £13 8s. 0d. per week for a first year appointee or £15 1s. 0d. if of twelve months' experience.

Applicants are requested to forward full particulars as to age, qualifications and experience and enclose copies only of credentials.

A. E. Sharp,
Secretary.

THE AUSTRALIAN SOCIETY OF ORTHODONTISTS

The opportunity was taken during Congress for a meeting of the Australian Society of Orthodontists. At this meeting the following officers were elected:—

President: Dr. A. Thornton Taylor.

Honorary Secretary/Treasurer: Mr. R. Y. Norton.

Council: Dr. K. T. Adamson, Dr. R. W. Halliday, Dr. V. P. Webb.

PRACTICE FOR SALE

Established dental practice—Singapore. Situated latest office building. Comprising seven rooms air-conditioned throughout. Modern equipment including X-ray. Averaging over £A400 monthly. Expanding. Quick sale due to ill-health. Price £A3,000 inclusive. Apply Editor.

DENTAL HEALTH EDUCATION DEPARTMENT

Members are reminded that several publications issued by the Department are available for distribution to their patients. This material is recommended as a simple and practical means of educating patients in matters of great importance to their dental welfare.

Included in the publications are the following, and members can obtain them on application to the Secretary of the Association, 135 Macquarie Street, Sydney. 'Phone BU 3045.

"Oral Hygiene"—a folder explaining, in simple language, the necessity for and methods of attaining a clean mouth. *Every patient needs this educational folder.*—Free.

"Toothbrush Technique"—an illustrated folder to supplement the above. This has proved of great practical value. These folders cost 10/- per 100.

"Healthy Mouths"—a comprehensive and illustrated booklet for all ages, fully covering the field of education in dental health matters. This publication is highly recommended.—Free.

"Your Baby's Teeth and Your Own"—a booklet prepared for the use of expectant mothers.—Free.

Association Activities

AUSTRALIAN DENTAL ASSOCIATION (NEW SOUTH WALES BRANCH)

Extract from Minutes of Meeting of Executive Committee held in the Council Room, B.M.A. House, 135-137 Macquarie Street, Sydney, on Monday, 10th July, 1950, at 7.30 p.m.

Present: Dr. E. R. Magnus, President, in the Chair; Dr. A. G. H. Lawes, Vice-President; Dr. R. M. Cloutier, Honorary Treasurer; Mr. H. McD. Finnie, Mr. W. A. Grainger, Mr. R. G. Leeder, Mr. R. Y. Norton, Mr. J. W. Skinner, Mr. Ralph Tompson, Mr. R. W. Wilson; Mr. C. D. Reynolds, Newcastle & Hunter River District Division; Dr. A. G. Rowell, Western Division.

Apologies: Dr. J. V. Hall Best, Mr. N. E. Edney, Dr. F. E. Helmore, Vice-President; Mr. R. Krauss, Mr. F. R. Reid, Mr. H. R. Sullivan, Mr. J. D. Benson, North and North-West Division.

In attendance: Mr. Robert Harris, Secretary.

Minutes: The minutes of the meeting held 19th June, 1950, were signed as a correct record.

Business Arising from Minutes:

Dr. Terrell's lecture tour: The Secretary reported that the arrangements for Dr. Terrell's lecture tour of the country districts were almost complete and that the Church of England National Emergency Fund Memorial Centre Hall had been booked for his lectures in Sydney; the lecture at Lismore will be held at 4 p.m. instead of 2.30 p.m. in view of the difficulties of transport but otherwise the arrangements are as previously stated.

Congress Commission:

The Secretary reported that Congress activities were progressing satisfactorily; a preliminary screening of some of the films had been held and the S.S. White Co. of Australia is arranging for a film "Airbrasive", depicting a new technique of cavity preparation, to be made available as a first release.

These films will be screened on the Thursday morning and will be sent to New Zealand after Congress and then back to America, but some may be available immediately after Congress and arrangements will be made for students to see them; one or two films may remain in Australia on permanent loan.

Reports from Committees:

Survey of Fees: Mr. Skinner reported that the Survey of Fees Committee had given consideration to initiating propaganda on fees and on the general introduction of a consultation fee.

It was resolved (1) that the tabulations of the Survey of Fees, as presented to the Executive by the Survey of Fees Committee on 8th May, 1950, be circulated by post to all members of the Branch; (2) that an explanatory covering letter be sent which will include the report of the Survey of Fees Committee presented on 8th May, 1950, excluding paragraph 5 and the appendix relating to the rise of costs of conducting a practice.

Consideration was then given to a third recommendation from the Survey of Fees Committee:

"That in view of the suggestion of the country delegates that a consultation fee be generally charged, it is suggested that a general meeting of the Australian Dental Association, New South Wales Branch, be held in September to discuss this question and that of current fees generally."

and in the ensuing discussion it was suggested that it was not within the province of the Association to discuss fees or to suggest any minimum or maximum fees.

It was resolved that this recommendation be not approved and that the Syllabus Committee be invited to arrange some other topic for the September general meeting.

Membership:

New Members: It was resolved that the following dental practitioners whose applications were in order and who had paid the requisite subscriptions be admitted to membership of this State Branch, as from 10th July, 1950:

Barrington, Kevin Morris, B.D.S.; Carolan, Barry Joseph, Dr.; Humphries, Victor Alfred, B.D.S.; Kelleway, Ivor Lee, B.D.S.; Latimer, Lorna June, B.D.S.; Morris, John Fosbrook, B.D.S.; Pidcock, John William, B.D.S.; Shilland, Alan Wallace, B.D.S.; Da Rosa, Denis Gerard, B.D.S.

Correspondence:

Federal Office Finance: A letter dated 23rd June, 1950, from the Honorary Secretary of the Australian Dental Association was read setting out a resolution passed at the Federal Executive meeting on 7th May, 1950, intimating that an increase in revenue will be necessary for the future conduct of the affairs of the Association.

It was resolved that this letter be received.

Dental Health Exhibit at Congress: A letter dated 30th June, 1950, from the Congress Commission was read intimating that it would not be possible to provide more than £150 towards the cost, £320, of the proposed Dental Health Section Exhibit and suggesting that the State Branch Executive might consider sharing the cost, particularly in view of the fact that the Exhibit is to be presented after Congress to the Dental Health Education Department. Mr. Tompson explained that the Exhibit would consist of floodlit coloured photographs with scripts highlighting children's preventive dentistry. It was noted from estimates which were tabled that it was anticipated that there would be approximately £50 remaining in the Dental Health Fund at the end of the financial year.

It was resolved (1) that the Executive Committee grant the sum of £150, of which £50 is to be provided from the Dental Health Education Fund, to defray the cost of the Dental Health Education Section of Congress Exhibit in the basement of the Town Hall during Congress week, over and above the £150 voted for the purpose by the Congress Commission and that a request be made that this sum be refunded to the State Branch if the Commission funds show any surplus; (2) that, in the event of any of this money becoming the financial responsibility of this State Branch, any such amount be made a charge against the Dental Health Education Account to be written off over a period of three years.

Fees for Treatment of Military Personnel: A circular dated May, 1950, from the Department of the Army relative to fees for the treatment of military personnel by civilian dentists was received.

Dental Research Scholarship: A letter dated 22nd June, 1950, from the Registrar of the University of Sydney requesting payment of £150 as this Association's contribution towards the second half-yearly instalment of the salary of Mr. B. Lilienthal who holds the Australian Dental Association, N.S.W. Branch, and Walter and Eliza Hall Dental Research Scholarship, was read.

It was resolved that payment of this £150 be made to the University of Sydney.

Dental Attendants & Secretaries Conciliation Committee: A letter dated 13th June, 1950, from the Industrial Registrar's Office was read intimating that nominations should be made for the appointment of a member and alternate members of the Dental Attendants and Secretaries Conciliation Committee.

It was resolved (1) that Mr. Harris be nominated as the Association's member on the Conciliation Committee and that Mr. Edney be nominated an alternate member; (2) that Mr. Norton be nominated as a second alternate member of the Committee.

Federation Dentaire Internationale: A letter dated 23rd June, 1950, from the XIth International Dental Congress of the Federation Dentaire Internationale relative to an invitation to Mr. A. R. Docking to speak at the International Dental Congress in London in 1952, was read and received.

Gilbert Henderson and Sgn.-Comdr. Richards: Letters of thanks for expressions of congratulations on the honours recently bestowed on them from Mr. Gilbert Henderson and Surgeon-Commander Richards were received.

Suburban Dental Groups:

Dr. Lawes suggested that the suburban dental groups should be informed of the happenings relative to the Federal Office so that there would be unanimity in any action taken by the Executive and pointed out that the Groups did not have representation on the Executive Committee in the same way that the Divisions had.

It was resolved (1) that this Executive authorise the Committee of the Honorary Officers to call a conference of two delegates from each of the Suburban Dental Groups to discuss matters pertaining to the Federal Body and such other matters as may be thought fit, such conference to be held within the next fortnight and the proceedings thereat reported back to the Executive Committee; (2) that, if as a result of this conference the Group agree that they wish to be informed of the New South Wales Branch's activities in regard to the Federal Body, the Honorary Officers be authorised to accept invitations to lecture on this subject to the Groups.

The meeting terminated at 10.00 p.m.

MEMORY DINNER

The Annual Memory Dinner, of former members of the old Dental Association of N.S.W., will be held at the Hotel Sydney, on 26th October, 1950, at 6.00 p.m.

Every effort will be made to circularize all those concerned, but it will be appreciated if anyone interested who has not yet received such notification would communicate with Mr. F. Nicholls, BW 9020, or Mr. L. S. McKern, 810 Military Road, Mosman, XM 2765.

Remember the date—26th October, 1950.

New Books and Publications

Atlas of Oral and Facial Lesions, by Ralph Howard Brodsky, D.M.D., Baltimore, 1948. The Williams & Wilkins Company. Price £52 16s. Od. *Our copy by courtesy of Angus & Robertson Ltd., Sydney.*

This atlas is a new departure in dental or medical literature. It consists essentially of a carefully prepared reference list of 100 Kodachrome slides and, where necessary, radiographic evidence is presented of the various lesions along with the detailed information on each slide.

A wide range of tumours and lesions of the soft tissues are listed and information is given as to the clinical condition of each case. Also, a short note on therapy is given at the end of the clinical story.

Clearly the material has been collated over a period of years by Dr. Brodsky. He quite frankly admits that he does not intend to convey a complete clinical picture of the treatment for each case, but merely lists an outline of the therapy. He is more interested in presenting the clinical picture of the lesion and, if the remaining 98 Kodachrome slides are of the standard of the two presented with this review copy, then the material would form an excellent basis for anyone interested, in particular, in the variety of lesions which are found in the oral cavity.

To those specialising in this field, it would appear that here is a ready reference to the frequently found lesions in the mouth, and to those not so frequently found.

It has been said many times that the mouth is a barometer in that the patient's physician would do well to know the details of various reactions which are exhibited in the oral tissues and have a clearer picture of the patient's general condition.

As a teaching aid, although it is obviously desirable to have first-hand information on various clinical material, this is not always possible and Dr. Brodsky is therefore to be congratulated on his compilation.

The atlas is designed in such a way that each lesion or condition is accompanied by a diagram which keys very quickly the Kodachrome slide.

This new departure could conceivably be extended into other fields of dental education, although the economic factor may, for a time at least, prevent a wide reception of what is certainly a most useful method.—R.H.

Index to Dental Literature, 1945-1947. Compiled by Martha Ann Mann, Bureau of Library and Indexing Service, Chicago, 1949. American Dental Association. *Our copy by courtesy of the Publishers.*

The Index appears in a new format which is pleasing to the eye and easy to read. It now covers one hundred and forty-four English language publications from Australia, Canada, England, India, New Zealand, South Africa and the United States.

The old form of the Index has now been completely changed, so that the Dewey Decimal System of classification has been abandoned and subject headings are used to classify material — author and subject matter are listed in alphabetical form. The fact that this is the third volume appearing in this form would appear to indicate that it will now be a permanent feature, and despite the many valuable features of the Dewey Decimal System, within the dental field at least, the alphabetical index has some distinct merit.

Once again we can compliment the workers who have contributed such a wide and comprehensive adjunct for library, editorial and research activities.

It is noted that the printing is by the offset process which, together with the high quality of the paper, has produced a volume of excellent standard.—R.H.

Biology, by P. D. F. Murray, M.A., D.Sc., London, 1950. Macmillan and Company. Price £1 5s. 0d. (*English*). *Our copy by courtesy of the publishers.*

The author, now occupying the Chair of Zoology in the University of Sydney, has designed the work primarily for the use of medical students studying biology among their preliminary sciences and for students taking the subject in higher classes in secondary schools. An exceedingly wide range of matter is presented in an interesting manner and with appropriate illustrations.

It is clear to the reader coming back to read such a subject how important its study is for those contemplating medicine, dentistry, agriculture or veterinary science and how frequently does the student in his earlier years tend to look upon such a subject as an additional and possibly unnecessary chore.

The author has endeavoured, and with considerable success, to include within the one book a wide range of information on plants and animals in such a manner as to stress the parallelism between the evolution of the two and presents many aspects of plant and animal physiology which lay the foundation for a wider study in the particular fields of human anatomy and physiology.

The chapters devoted to evolution and growth patterns and changes are stimulatingly presented and will serve to confront the reader with the necessity of approaching the fields of tertiary education with an untrammelled mind. When the reader comes across a passage where reference is made to the biblical account of creation in such a sentence as "There is in history no more devastating example of the paralysis inflicted upon the human mind by undue reverence for the written word," it is realised that here is an author who is prepared to throw down the gauntlet and is himself willing to admit his own written word to close scrutiny and rejection or approbation.

This example is quoted simply as an illustration of Professor Murray's dispassionate approach to his subject and as a reminder to the reader that in science one cannot believe—one must conclude.

The book is well set out, with an extensive index, and therefore is easy for reference.—R.H.

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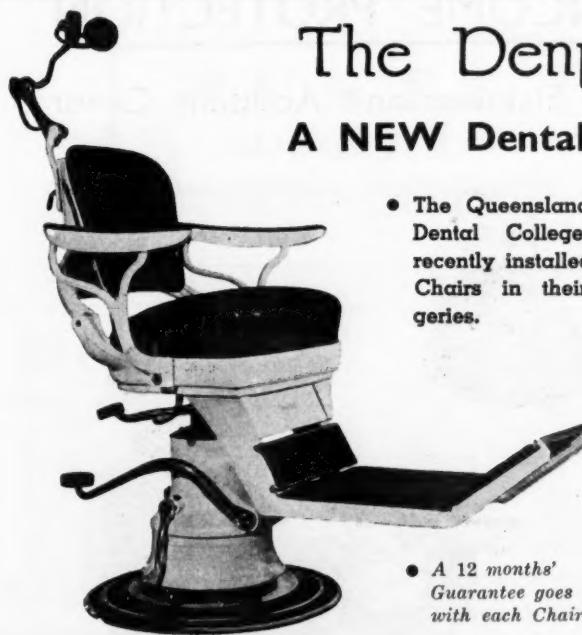
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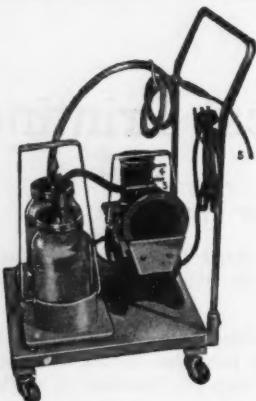
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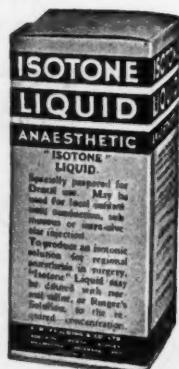
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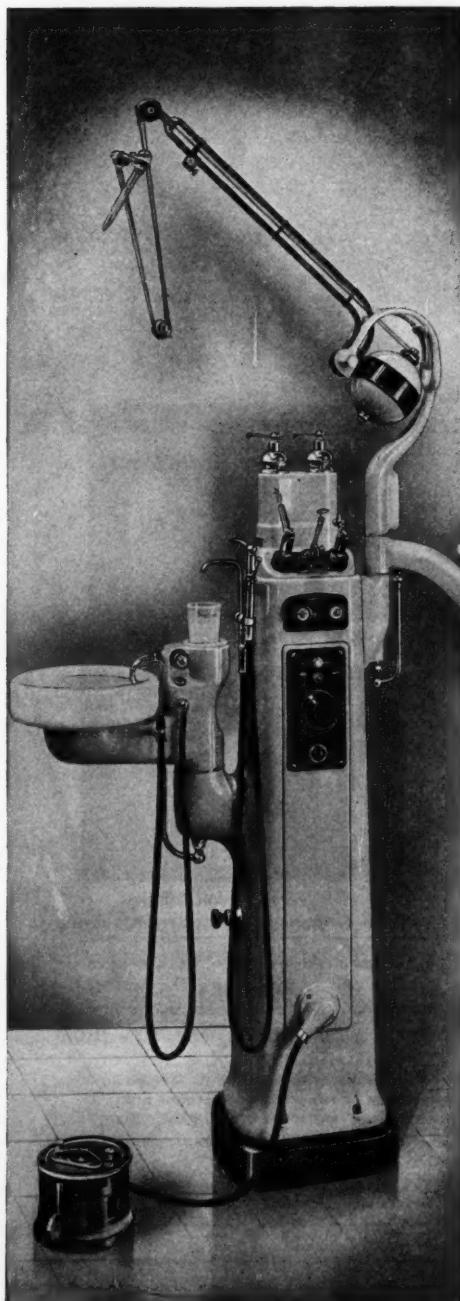


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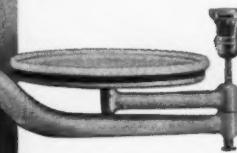
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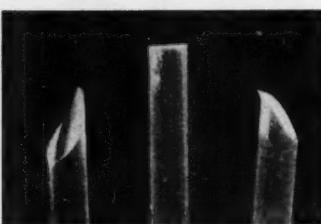
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AUSTRALIAN MILITARY FORCES VACANCIES FOR DENTAL OFFICERS

Applications are invited from legally qualified male dental practitioners for appointment to short service commissions in the Australian Regular Army as dental officers.

The terms of appointment are as follow:

- (a) Duration of appointment: Two years. Applicants may elect to serve for one additional period of two years.
- (b) Rank on commencement: Captain.
- (c) Pay and allowances: The following schedule shows the daily rates of pay and allowances:

Detail	Officers not eligible for marriage allowance		Officers eligible for marriage allowance		
	Living in Camp	Living out of Camp	Living in Camp	Living at Home	Living out of camp and away from Home
1. Rate of pay	39/9	39/9	39/9	39/9	39/9
2. Uniform allowance ..	1/3	1/3	1/3	1/3	1/3
3. Marriage allowance ..	—	—	4/9	4/9	4/9
4. Provision allowance ..	—	—	—	4/-	—
5. Separation allowance ..	—	—	3/-	—	3/-
6. Living-out allowance ..	—	6/3*	—	—	9/-
	41/-	47/3	48/9	49/9	57/9

* 7/6 per day is payable for the first 30 days.

In addition to the rates set out above, an increment of 3/- per day is payable after two years' service, and a further 3/- per day after 4 years' service in the rank of Captain. (Note: Applicants with previous full-time service in the rank of Captain or equivalent may count such previous service for the purpose of computing these increments.)

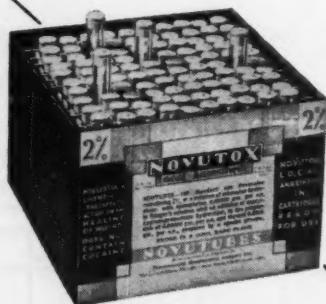
- (d) Gratuity:
 - (i) A gratuity at the rate of £125 per annum will be payable on completion of the total period of service (i.e., either two or four years).
 - (ii) In the event of a dental officer's death or total incapacity (not due to causes within his own control) the gratuity of £250 for a dental officer appointed for two years, or £500 for a dental officer appointed for a further two years, will be paid either to the wife and/or children in the case of death, or to the officer in the case of total incapacity.
 - (iii) In the event of the officer's partial incapacity (not due to causes within his own control), a proportionate gratuity pro rata to the length of his service will be paid to the officer.
- (e) Retirement Benefits Fund: Dental officers serving on short service commissions will be required to contribute to the Defence Forces Retirement Benefits Fund.
- (f) Uniform: An initial issue of clothing and necessaries will be free.
- (g) Medical Standard: Applicants will be required to pass the approved medical examination.

Applications should be made in writing to THE SECRETARY, Department of the Army, Victoria Barracks, MELBOURNE, S.C.1.

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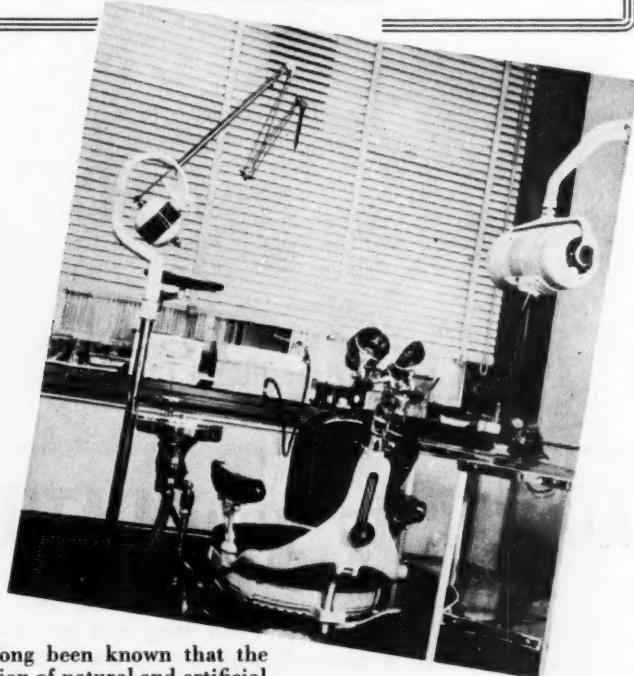
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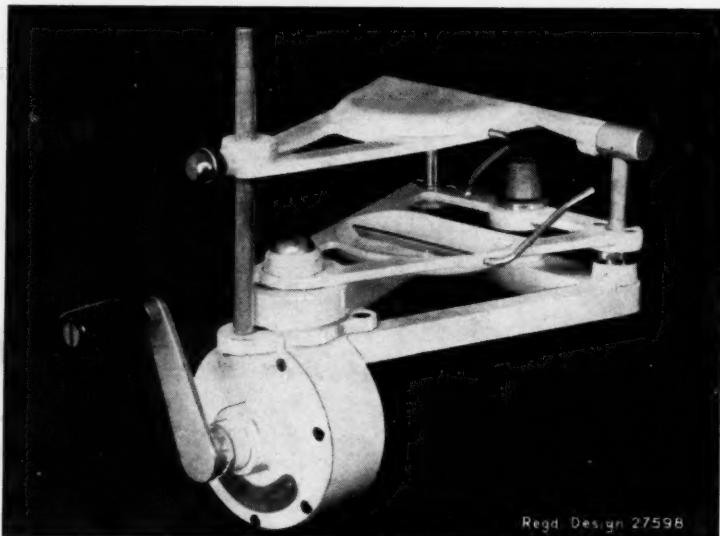
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